MDRO Reporting and Investigation in Michigan

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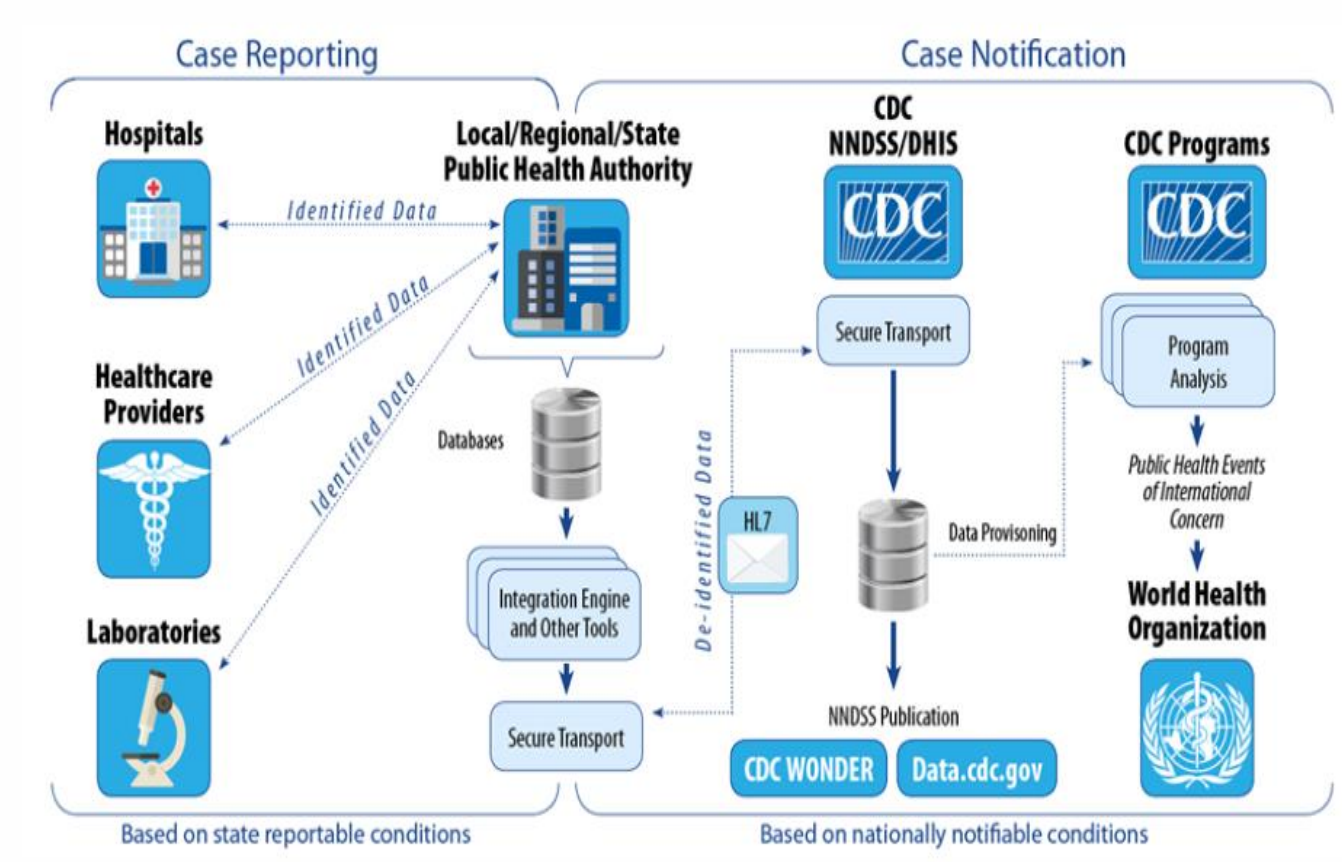
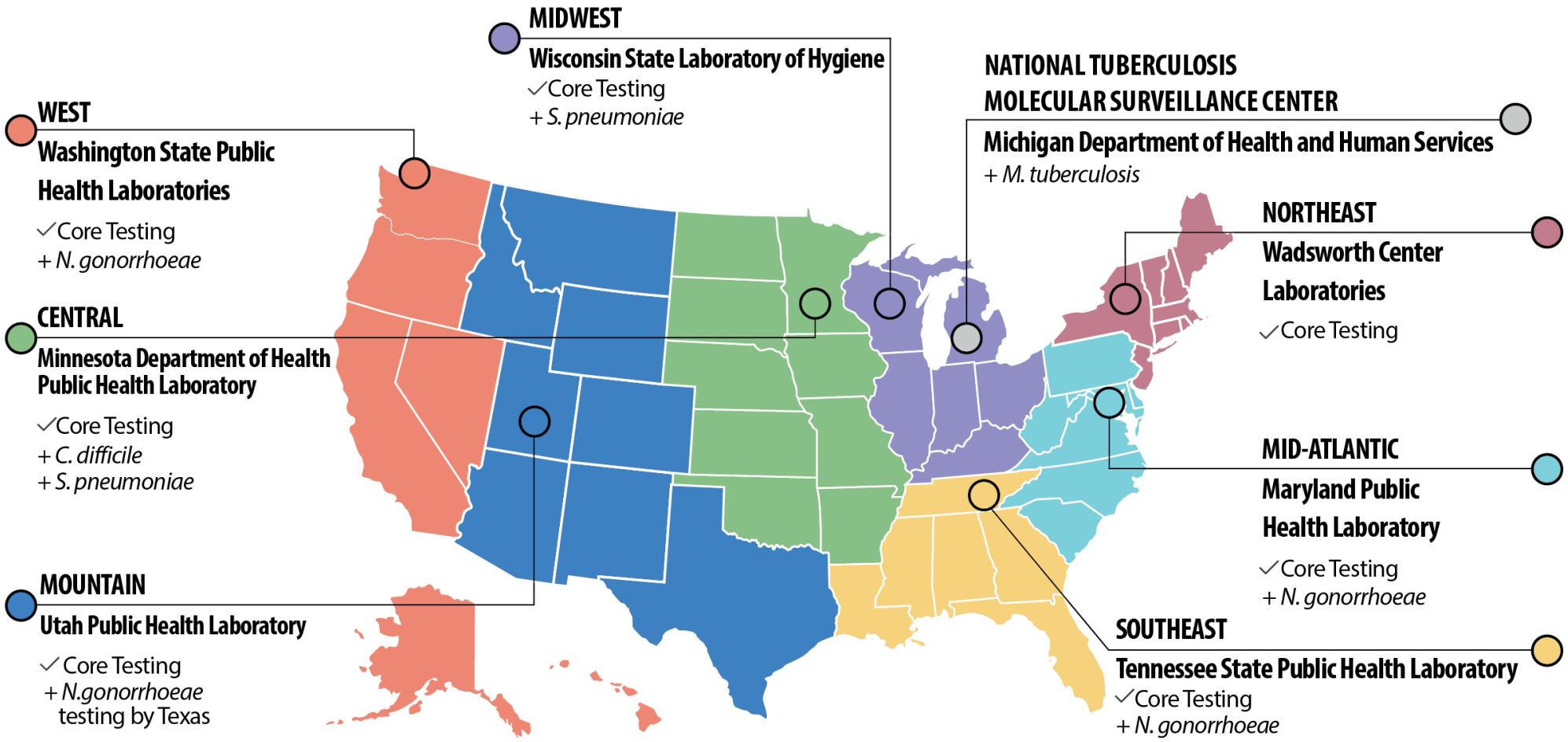
Reportable Diseases in Michigan

- Michigan Disease Surveillance System (MDSS) is the state database for collecting surveillance data.
  - Web-based communicable disease reporting system
  - Cases can be reported by:
    - Electronic laboratory report (ELR)
    - Manual case entry
- Required case reporting to MDSS by healthcare providers and laboratories
- Surveillance case definition endorsed by CSTE/CDC, nationally notifiable



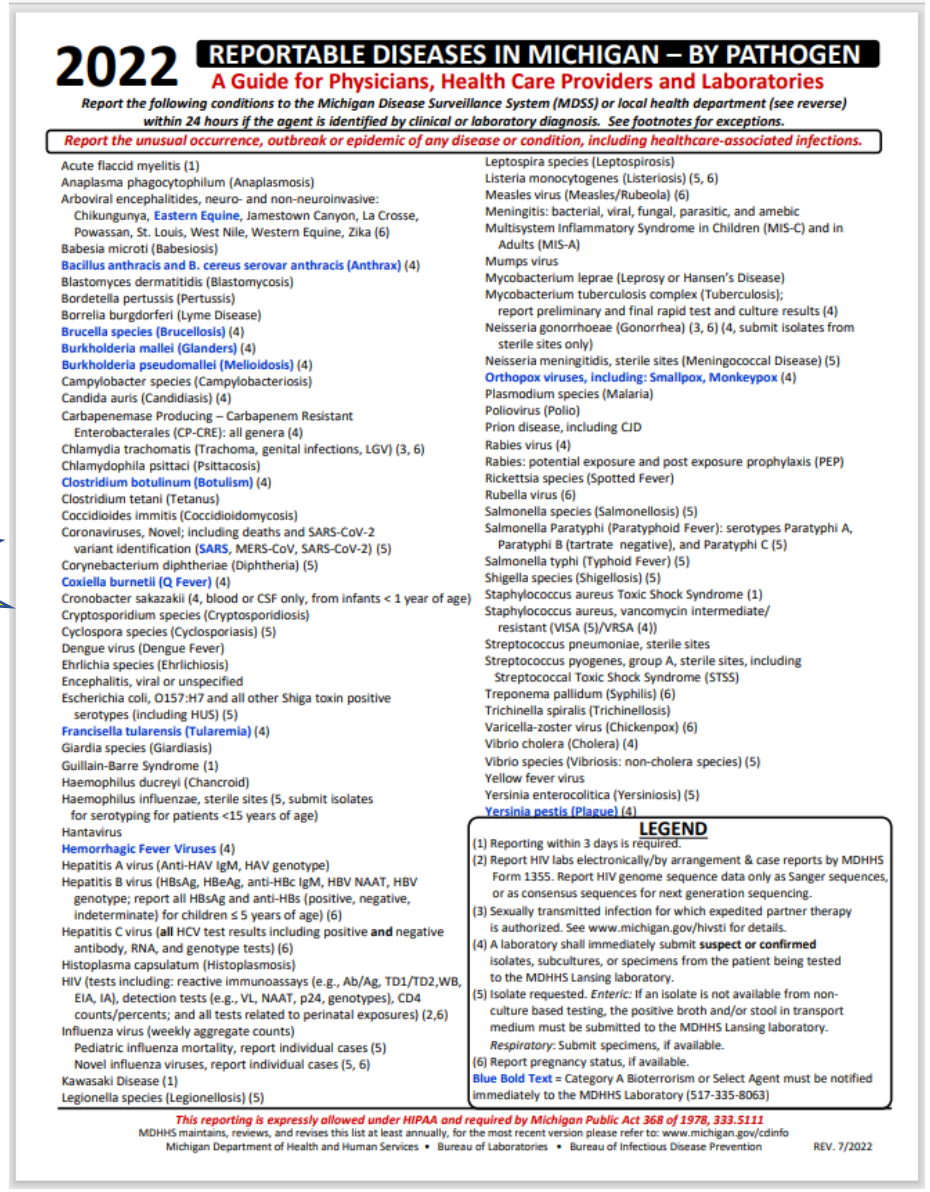
Antibiotic Resistance Laboratory Network



Antimicrobial Resistant Reportable Diseases

- *Candida auris* (Candidiasis)
- Carbapenem-Producing, Carbapenem-Resistant *Enterobacterales* (CP-CRE). Reportable in MI starting January 2018
  - **CP-CRE Case Surveillance**
    - **Required case reporting** to MDSS by healthcare providers and laboratories
    - Carbapenemase producing – carbapenem resistant ***Enterobacterales (All Genera)***
  - **CP-CRE Isolate Surveillance**
    - **Required isolate submission** to BOL by laboratories
    - Carbapenemase-producing – carbapenem resistant ***Enterobacterales (All Genera)***
- *Staphylococcus aureus,* Vancomycin Intermediate/Resistant (VISA/VRSA)
- Unusual occurrence, outbreak, or epidemic

NEW for 2022



2022 REPORTABLE DISEASES IN MICHIGAN – BY PATHOGEN

A Guide for Physicians, Health Care Providers and Laboratories

Report the following conditions to the Michigan Disease Surveillance System (MDSS) or local health department (see reverse) within 24 hours if the agent is identified by clinical or laboratory diagnosis. See footnotes for exceptions.

Report the unusual occurrence, outbreak or epidemic of any disease or condition, including healthcare-associated infections.

Acute flaccid myelitis (1)
Anaplasma phagocytophilum (Anaplasmosis)
Arboviral encephalitides, neuro- and non-neuroinvasive: Chikungunya, **Eastern Equine**, Jamestown Canyon, La Crosse, Powassan, St. Louis, West Nile, Western Equine, Zika (6)
Babesia microti (Babesiosis)
Bacillus anthracis and B. cereus serovar anthracis (Anthrax) (4)
Blastomyces dermatitidis (Blastomycosis)
Bordetella pertussis (Pertussis)
Borrelia burgdorferi (Lyme Disease)
Brucella species (Brucellosis) (4)
Burkholderia mallei (Glanders) (4)
Burkholderia pseudomallei (Melioidosis) (4)
Campylobacter species (Campylobacteriosis)
Candida auris (Candidiasis) (4)
Carbapenemase Producing – Carbapenem Resistant Enterobacterales (CP-CRE): all genera (4)
Chlamydia trachomatis (Trachoma, genital infections, LGV) (3, 6)
Chlamydophila psittaci (Psittacosis)
Clostridium botulinum (Botulism) (4)
Clostridium tetani (Tetanus)
Coccidioides immitis (Coccidioidomycosis)
Coronaviruses, Novel; including deaths and SARS-CoV-2 variant identification (**SARS**, MERS-CoV, SARS-CoV-2) (5)
Corynebacterium diphtheriae (Diphtheria) (5)
Coxiella burnetii (Q Fever) (4)
Cronobacter sakazakii (4, blood or CSF only, from infants < 1 year of age)
Cryptosporidium species (Cryptosporidiosis)
Cyclospora species (Cyclosporiasis) (5)
Dengue virus (Dengue Fever)
Ehrlichia species (Ehrlichiosis)
Encephalitis, viral or unspecified
Escherichia coli, O157:H7 and all other Shiga toxin positive serotypes (including HUS) (5)
Francisella tularensis (Tularemia) (4)
Giardia species (Giardiasis)
Guillain-Barre Syndrome (1)
Haemophilus ducreyi (Chancroid)
Haemophilus influenzae, sterile sites (5, submit isolates for serotyping for patients <15 years of age)
Hantavirus
Hemorrhagic Fever Viruses (4)
Hepatitis A virus (Anti-HAV IgM, HAV genotype)
Hepatitis B virus (HBsAg, HBeAg, anti-HBc IgM, HBV NAAT, HBV genotype; report all HBsAg and anti-HBs (positive, negative, indeterminate) for children ≤ 5 years of age) (6)
Hepatitis C virus (**all** HCV test results including positive **and** negative antibody, RNA, and genotype tests) (6)
Histoplasma capsulatum (Histoplasmosis)
HIV (tests including: reactive immunoassays (e.g., Ab/Ag, TD1/TD2,WB, EIA, IA), detection tests (e.g., VL, NAAT, p24, genotypes), CD4 counts/percents; and all tests related to perinatal exposures) (2,6)
Influenza virus (weekly aggregate counts)
Pediatric influenza mortality, report individual cases (5)
Novel influenza viruses, report individual cases (5, 6)
Kawasaki Disease (1)
Legionella species (Legionellosis) (5)
Leptospira species (Leptospirosis)
Listeria monocytogenes (Listeriosis) (5, 6)
Measles virus (Measles/Rubeola) (6)
Meningitis: bacterial, viral, fungal, parasitic, and amebic
Multisystem Inflammatory Syndrome in Children (MIS-C) and in Adults (MIS-A)
Mumps virus
Mycobacterium leprae (Leprosy or Hansen's Disease)
Mycobacterium tuberculosis complex (Tuberculosis); report preliminary and final rapid test and culture results (4)
Neisseria gonorrhoeae (Gonorrhea) (3, 6) (4, submit isolates from sterile sites only)
Neisseria meningitidis, sterile sites (Meningococcal Disease) (5)
Orthopox viruses, including: Smallpox, Monkeypox (4)
Plasmodium species (Malaria)
Poliovirus (Polio)
Prion disease, including CJD
Rabies virus (4)
Rabies: potential exposure and post exposure prophylaxis (PEP)
Rickettsia species (Spotted Fever)
Rubella virus (6)
Salmonella species (Salmonellosis) (5)
Salmonella Paratyphi (Paratyphoid Fever): serotypes Paratyphi A, Paratyphi B (tartrate negative), and Paratyphi C (5)
Salmonella typhi (Typhoid Fever) (5)
Shigella species (Shigellosis) (5)
Staphylococcus aureus Toxic Shock Syndrome (1)
Staphylococcus aureus, vancomycin intermediate/ resistant (VISA (5)/VRSA (4))
Streptococcus pneumoniae, sterile sites
Streptococcus pyogenes, group A, sterile sites, including Streptococcal Toxic Shock Syndrome (STSS)
Treponema pallidum (Syphilis) (6)
Trichinella spiralis (Trichinellosis)
Varicella-zoster virus (Chickenpox) (6)
Vibrio cholera (Cholera) (4)
Vibrio species (Vibriosis: non-cholera species) (5)
Yellow fever virus
Yersinia enterocolitica (Yersiniosis) (5)
Yersinia pestis (Plague) (4)

LEGEND

(1) Reporting within 3 days is required.
(2) Report HIV labs electronically/by arrangement & case reports by MDHHS Form 1355. Report HIV genome sequence data only as Sanger sequences, or as consensus sequences for next generation sequencing.
(3) Sexually transmitted infection for which expedited partner therapy is authorized. See www.michigan.gov/hivsti for details.
(4) A laboratory shall immediately submit **suspect or confirmed** isolates, subcultures, or specimens from the patient being tested to the MDHHS Lansing laboratory.
(5) Isolate requested. *Enteric*: If an isolate is not available from non-culture based testing, the positive broth and/or stool in transport medium must be submitted to the MDHHS Lansing laboratory. *Respiratory*: Submit specimens, if available.
(6) Report pregnancy status, if available.
Blue Bold Text = Category A Bioterrorism or Select Agent must be notified immediately to the MDHHS Laboratory (517-335-8063)

This reporting is expressly allowed under HIPAA and required by Michigan Public Act 368 of 1978, 333.5111

MDHHS maintains, reviews, and revises this list at least annually, for the most recent version please refer to: www.michigan.gov/cdinfo
Michigan Department of Health and Human Services • Bureau of Laboratories • Bureau of Infectious Disease Prevention REV. 7/2022

https://www.michigan.gov/cdinfo

2022 Brick Book and CD Lists

Candida auris Reporting Requirements

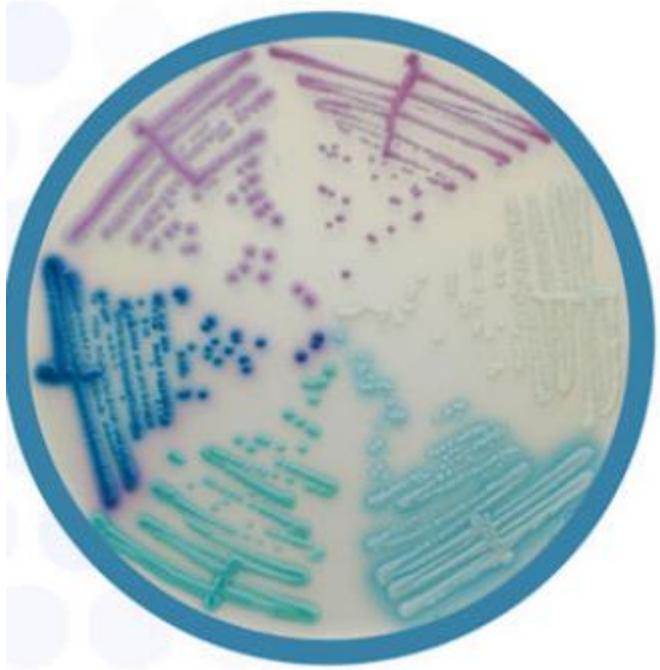
- Report any laboratory finding that meets either of the following criteria:
  - Detection of *C. auris* in a specimen using either culture or a culture-independent diagnostic test (CIDT) (e.g., Polymerase Chain Reaction [PCR])
  - Detection of an organism that commonly represents a *C. auris* misidentification in a specimen by culture (i.e., *Candida haemulonii*)

- Laboratories **shall immediately submit confirmed or suspect *C. auris*** isolates, subcultures, or specimens from the patient being tested to the MDHHS Lansing laboratory

Candida auris Case Report

Confirmatory laboratory evidence:

- Detection of *C. auris* from any body site using either culture or a culture independent diagnostic test (CIDT) (e.g., Polymerase Chain Reaction [PCR]).



Lab Results

Report Date	Test Name	Reported Test Name/Test Result		Specimen	Collection Date
(mm/dd/yyyy)					*(mm/dd/yyyy)*
03/25/2022	Fungal Identification	Fungus identified/null	Candida auris///	Ear sample	05/20/2021
03/25/2022	Fungus identified	Fungus identified/Fungal Cultural Human	Candida auris///		05/20/2021
06/02/2021	Culture and Gram Stain Ear	BACTERIA IDENTIFIED:PRID:PT:EAR:NOM:AEROBIC CULTURE/Culture and Gram Stain Ear	Candida auris///	Ear sample	05/20/2021
05/25/2021	Culture and Gram Stain Ear	BACTERIA IDENTIFIED:PRID:PT:EAR:NOM:AEROBIC CULTURE/Culture and Gram Stain Ear	Candida auris///	Ear sample	05/20/2021
05/20/2021	Bacteria Identification [Presence] in Isolate by Culture	Bacteria Identification [Presence] in Isolate by Culture	//with normal skin flora CANDIDA AURIS Quantity of Organism: MODERATE/		05/24/2021

NEW for 2022

2022 CP-CRE Case Reporting to MDSS

Physicians and laboratories must report cases of CP-CRE:

- ✓Healthcare record contains a **diagnosis** of **Carbapenemase-producing Carbapenem-resistant Enterobacterales (CP-CRE),** with KPC, NDM, OXA-48, IMP, VIM or a novel carbapenemase
- ✓**Any Enterobacterales isolate** demonstrating carbapenemase production by a **phenotypic** test (e.g., Carba NP, CIM, mCIM)
- ✓**Any Enterobacterales isolate** with a known carbapenemase resistance mechanism by a recognized **molecular test** (e.g., PCR, Expert Carba-R) for Klebsiella pneumoniae carbapenemase (KPC), New Delhi metallo-β-lactamase (NDM), Verona integron encoded metallo-β-lactamase (VIM), Imipenemase metallo-β-lactamase (IMP), Oxacillinase-48 (OXA-48)
- ✓If testing for carbapenemase production (phenotypic) or carbapenemase resistance mechanism (molecular test) was not conducted or reported, **any Enterobacterales** isolate with a **minimum inhibitory concentration** of ≥4 mcg/ml for meropenem, imipenem, or doripenem, or ≥ 2 mcg/ml for ertapenem by antimicrobial susceptibility testing
  - ✓ *Morganella, Proteus, Providencia* spp. may have intrinsic resistance to imipenem. Only those isolates that are resistant to 1 or more carbapenems other than imipenem should be reported.

NEW for 2022

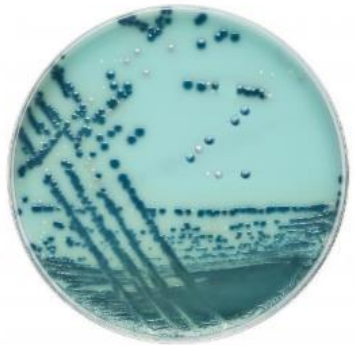
2022 CP-CRE Isolate Submission to BOL

Laboratories must submit isolates of CP-CRE:

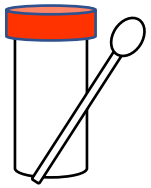
- **Any Enterobacterales** isolate demonstrating carbapenemase production by a phenotypic method
- **Any Enterobacterales** isolate with a known carbapenemase resistance mechanism by a recognized molecular test
- If laboratories are unable to detect CP-CRE (i.e., cannot test for carbapenemase production or carbapenemase resistance mechanism), **any Enterobacterales** isolate with a minimum inhibitory concentration of ≥4 mcg/ml for meropenem, imipenem, or doripenem, or ≥ 2 mcg/ml for ertapenem by antimicrobial susceptibility testing
    - *Morganella, Proteus, Providencia* spp. may have intrinsic resistance to imipenem. Only those isolates that are resistant to 1 or more carbapenems other than imipenem should be reported and submitted.

MDHHS Bureau of Laboratories (BOL):

- Confirm organism identification
- Perform mCIM testing
- Perform PCR testing for KPC, NDM, OXA-48, IMP, VIM
    - If mCIM or PCR are positive, antimicrobial susceptibility testing (AST) will be performed

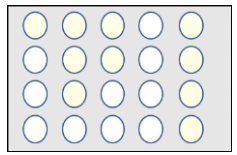


Clinical Microbiology Laboratory Testing

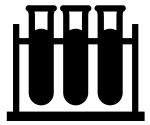


Specimen Collected

Organism Identification & Quantitation



Antibiotic Susceptibility Testing



Phenotypic Testing for Presence of Carbapenemase Enzymes

Genotypic Testing for Presence of Carbapenemase Genes (e.g., Blood Specimens)

≥100,000 CFU/ml Klebsiella pneumoniae, see comment

Comment: Carbapenem resistant Enterobacteriaceae.

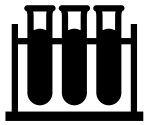
Antibiotic	MIC	Interpretation
Ampicillin	≥32	Resistant
Ampicillin/sulbactam	≥32	Resistant
Aztreonam	≥64	Resistant
Cefazolin	≥64	Resistant
Cefepime	2	Resistant
Ceftriaxone	8	Resistant
Ertapenem	2	Resistant
Gentamicin	≤2	Susceptible
Levofloxacin	≤1	Susceptible
Meropenem	1	Susceptible
Piperacillin/tazobactam	64	Intermediate
Tobramycin	≤2	Susceptible
Trimethoprim/sulfamethoxazole	≤2	Susceptible

MDHHS BOL Laboratory Antimicrobial Resistance Confirmation Testing

Clinical Micro Lab

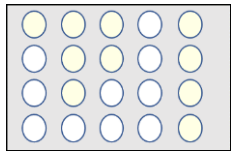
Pure Isolate

Organism ID Confirmation

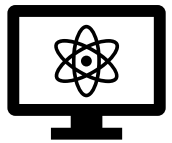


Phenotypic Testing for Presence of Carbapenemase Enzymes (mCIM Test)

Genotypic Testing for Presence of Carbapenemase Genes (PCR)



Antibiotic Susceptibility Testing



Whole Genome Sequencing

Antimicrobial Resistance Confirmation (ARC)

Gram Stain

Gram negative bacilli

Culture Results

Confirmed as Klebsiella pneumoniae

Identification Performed by MALDI-TOF.

Antimicrobial Susceptibility Results

	Klebsiella pneumoniae	
	MIC - Interpretation	
Amikacin	<=4	S
Aztreonam	>16	R
Cefepime	4	SDD
Cefotaxime	32	R
Ceftazidime	>16	R

Modified Carbapenem Inactivation Method

Positive

Phenotypic test

Modified Carbapenem Inactivation Method (mCIM) screen positive - this isolate demonstrates carbapenemase production. The clinical efficacy of the carbapenems has not been established for treating infections caused by Enterobacteriaceae and Pseudomonas aeruginosa that test carbapenem susceptible but demonstrate carbapenemase production in vitro. ISOLATES THAT ARE mCIM POSITIVE SHOULD BE CONSIDERED RESISTANT TO ALL CARBAPENEMS REGARDLESS OF MIC. MIC REPORTED FOR EPIDEMIOLOGIC PURPOSES ONLY.

PCR Result

KPC (bla-KPC) gene DNA Detected

Molecular test

NDM-1 (bla-NDM-1) gene DNA Not Detected

OXA-48 (bla-OXA-48 like) gene DNA Not Detected

VIM (bla-VIM) gene DNA Not Detected

KPC, NDM, OXA-48, and VIM are the most common carbapenemases in the United States, however there are other less common carbapenemases and other mechanisms of carbapenemase resistance not detected by this PCR assay.

IMP PCR Result

IMP (bla-IMP) gene DNA Not Detected

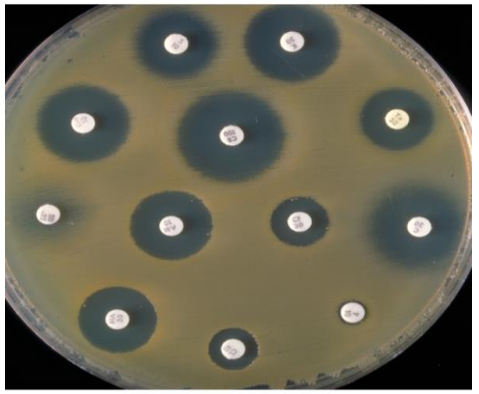
CP-CRE Case Classification

Confirmed CP-CRE

- *Enterobacterales*
  - Positive **phenotypic test** (e.g., mCIM, Carba NP, etc.) OR
  - Positive **molecular test** (e.g., PCR, Cepheid Xpert, etc.) **- carbapenem resistance mechanism:** KPC, NDM, VIM, IMP, OXA-48, etc.

Suspect CP-CRE

- *Enterobacterales*
  - **Resistance to at least 1 carbapenem on susceptibility test- MIC result**
  - No phenotypic or molecular testing done (isolate should be submitted to BOL)



Not a Case

- Negative for phenotypic and molecular tests conducted
- All carbapenems are susceptible (MICs don't match case definition)
- Not *Enterobacterales*

CSTE Case definition

Carbapenemase Producing Carbapenem-Resistant Enterobacteriaceae (CP-CRE) 2018 Case Definition | CDC

MDHHS BOL ELR Lab Report Interpretation – Confirmed CP-CRE

Lab Results

Report Date	Test Name	Reported Test Name/Test Result		Specimen	Collection Date
(mm/dd/yyyy)					*(mm/dd/yyyy)*
01/06/2021	Culture Results	Bacteria identified/null	Klebsiella pneumoniae///	Other	12/20/2020
01/06/2021	Antimicrobial Susceptibility Results	Doripenem/null Ertapenem/null Imipenem/null Meropenem/null	///> 2 ///> 4 ///> 8 ///> 8		12/20/2020
01/06/2021	Modified Carbapenem Inactivation Method	Carbapenemase/null	Positive///		12/20/2020
01/06/2021	PCR Result	bla(KPC) gene/null Bacterial carbapenem resistance blaNDM gene/null Bacterial carbapenem resistance blaOXA-48-like gen/null Bacterial carbapenem resistance blaVIM gene/null	KPC (bla-KPC) gene DNA Not Detected/// NDM-1 (bla-NDM-1) gene DNA Detected/// OXA-48 (bla-OXA-48 like) gene DNA Not Detected/// VIM (bla-VIM) gene DNA Not Detected///		12/20/2020
01/06/2021	IMP PCR Result	Bacterial carbapenem resistance blaIMP gene/null	IMP (bla-IMP) gene DNA Not Detected///		12/20/2020
01/06/2021	Carbapenem resistance genes	Carbapenem resistance genes/ARC	Klebsiella pneumoniae///		12/20/2020
01/05/2021	Culture Results	Bacteria identified/	Klebsiella pneumoniae///	Other	12/20/2020
01/05/2021	PCR Result	bla(KPC) gene/ Bacterial carbapenem resistance blaNDM gene/ Bacterial carbapenem resistance blaOXA-48-like gen/ Bacterial carbapenem resistance blaVIM gene/	KPC (bla-KPC) gene DNA Not Detected/// NDM-1 (bla-NDM-1) gene DNA Detected/// OXA-48 (bla-OXA-48 like) gene DNA Not Detected/// VIM (bla-VIM) gene DNA Not Detected///		12/20/2020

Antimicrobial Resistance Confirmation (ARC)

Gram Stain

Gram negative bacilli

Culture Results

Confirmed Identification by MALDI-TOF - Klebsiella pneumoniae

Antimicrobial Susceptibility Results

	Klebsiella pneumoniae	
	MIC - Interpretation	
Aztreonam	>16	R
Cefepime	>16	R

Modified Carbapenem Inactivation Method

Positive

Modified Carbapenem Inactivation Method (mCIM) screen positive - this isolate demonstrates carbapenemase production. The clinical efficacy of the carbapenems has not been established for treating infections caused by Enterobacteriaceae and Pseudomonas aeruginosa that test carbapenem susceptible but demonstrate carbapenemase production in vitro. ISOLATES THAT ARE mCIM POSITIVE SHOULD BE CONSIDERED RESISTANT TO ALL CARBAPENEMS REGARDLESS OF MIC. MIC REPORTED FOR EPIDEMIOLOGIC PURPOSES ONLY.

PCR Result

KPC (bla-KPC) gene DNA Not Detected

NDM-1 (bla-NDM-1) gene DNA Detected

IMP PCR Result

IMP (bla-IMP) gene DNA Not Detected

16S rRNA Sequencing, PCR, and MALDI-TOF tests were developed and their performance characteristics determined by the Michigan Department of Health and Human Services (MDHHS). They have not been cleared or approved by the U.S. Food and Drug Administration (FDA). The FDA has determined that such clearance or approval is not necessary if performance characteristics are verified at the testing laboratory.

Initial screening for carbapenemase genes performed using Cepheid GeneXpert which has been FDA approved for this testing.

MDHHS BOL ELR Lab Report Interpretation – Not a Case, CP-CRE

Date Collected	07/22/2021	**Patient Last Name**	[redacted]
Time Collected	1014	**Patient First Name**	[redacted]
Date Received	07/29/2021	**Patient DOB**	[redacted]
Specimen Type	SPUTUM	**Submitter Patient ID**	[redacted]
		Gender	[redacted]
		Physician	[redacted]
		Submitter Identifier	P51690
		Reason for Test	DIAGNOSIS

TEST RESULTS

Antimicrobial Resistance Confirmation (ARC)

Gram Stain

Direct Gram Stain Not Done

Culture Results

Confirmed Identification by MALDI-TOF - Enterobacter cloacae complex

Modified Carbapenem Inactivation Method

Negative

Modified Carbapenem Inactivation Method (mCIM) screen negative - not all carbapenemase-producing isolates of Enterobacteriaceae and Pseudomonas aeruginosa are mCIM positive.

16S rRNA Sequencing, PCR, and MALDI-TOF tests were developed and their performance characteristics determined by the Michigan Department of Health and Human Services (MDHHS). They have not been cleared or approved by the U.S. Food and Drug Administration (FDA). The FDA has determined that such clearance or approval is not necessary if performance characteristics are verified at the testing laboratory.

Initial screening for carbapenemase genes performed using Cepheid GeneXpert which has been FDA approved for this testing.

Lab Reports Help

Date Received	Collection Date	Test Name (* Case Associated)	Result	Electronic	
08/11/2021	07/22/2021	Culture Results	Enterobacter cloacae complex	Yes	View
08/11/2021	07/22/2021	Modified Carbapenem Inactivation Method	Negative	Yes	View
08/11/2021	07/22/2021	Carbapenem resistance genes	Enterobacter cloacae complex	Yes	View
		Modified Carbapenem Inactivation			

Clinical Lab Report Interpretation – Suspect, CP-CRE, manual case entry

Urine Culture (Source: Clean Catch)

Collected: 12/23/2020 15:11 Status: Final result Visible to patient: No (not released)

Specimen Information: Urine, Indwelling Catheter
Indwelling catheter

Component			
Special Requests	None		
Results	>100000 CFU per ml Klebsiella pneumoniae		
Susceptibility			
Klebsiella pneumoniae			
Antibiotic	Interpretation	Value	Method
Amikacin	Susceptible	<=2	MIC MYLA
Ampicillin	Resistant	>=32	MIC MYLA
Ampicillin/Sulbactam	Resistant	>=32	MIC MYLA
Cefazolin	Resistant	>=64	MIC MYLA
Cefepime	Resistant	<=1	MIC MYLA
Ceftriaxone	Resistant	<=1	MIC MYLA
Ciprofloxacin	Susceptible	<=0.25	MIC MYLA
Ertapenem	Resistant	<=0.5	MIC MYLA
Gentamicin	Susceptible	<=1	MIC MYLA
Meropenem	Resistant	>=16	MIC MYLA
Meropenem		This organism is resistant to one or more carbapenems. Follow infection control requirements for CRE.	MIC MYLA

Laboratory Testing and Microbiology Information

Type of facility where specimen was collected:
(•) Acute Care Hospital ( ) Long-Term Acute Care Hospital ( ) Long-Term Care Facility ( ) Outpatient ( ) Other
( ) Autopsy ( ) Unknown

Date Specimen Collected *(mm/dd/yyyy)*: 12/23/2020
County of the facility where specimen collected: [redacted]
Facility where specimen collected: [redacted]

Clinical Specimen Source: Urine specimen
Other source, specify:
Specimen site, if available:

Organism: Klebsiella pneumoniae
( ) *Other, specify:*

Was Antimicrobial Susceptibility Testing performed? ( ) Yes ( ) No ( ) Unknown

Antimicrobial Susceptibility Testing Results:

Antimicrobial	Minimum Inhibitory Concentration (MIC) (ug/ml)	Interpretation (S, susceptible; I, Intermediate; R, resistant)
Doripenem		
Ertapenem		
Imipenem		
Meropenem	>=16	R

Phenotype Tests: Not Tested
If Other, specify:
Result: ( ) Positive ( ) Negative ( ) Indeterminate

Molecular Tests: Not Tested
If Other, specify:
Result: ( ) Positive ( ) Negative ( ) Indeterminate

Resistance Mechanism for Carbapenemase Testing	Response
KPC	( ) Detected ( ) Not detected ( ) Not tested ( ) Invalid
NDM	( ) Detected ( ) Not detected ( ) Not tested ( ) Invalid
VIM	( ) Detected ( ) Not detected ( ) Not tested ( ) Invalid
IMP	( ) Detected ( ) Not detected ( ) Not tested ( ) Invalid
OXA-48	( ) Detected ( ) Not detected ( ) Not tested ( ) Invalid
OXA-23	( ) Detected ( ) Not detected ( ) Not tested ( ) Invalid
Other, specify	( ) Detected ( ) Not detected ( ) Not tested ( ) Invalid

Clinical Lab Specimen ID (unique isolate No.): [redacted]
Bureau of Labs Specimen ID:
WGS Accession ID:

Clinical Lab ELR Report Interpretation – Suspect CP-CRE

Lab Report Date (mm/dd/yyyy) : 05/23/2021

Ordering Provider

First : [redacted] E LEON

Affiliation : BEAUMONT HEALTH SYSTEM Street : 17000 HUBBARD DR

City : DEARBORN County : Wayne State : Michigan Zip : 48126

Phone number : 313-982-4351 Ext :

Laboratory Information

Lab Name* : Oakwood Hospital - Dearborn

Street : 18101 Oakwood Blvd Geocode Source :

City : Dearborn County : Wayne State : Michigan Zip : 48124

Phone number :

Specimen Information

Specimen Collection Date (mm/dd/yyyy) : 05/19/2021

Specimen Source :

Specimen Site :

Specimen Site Text :

Specimen ID : [redacted]

Results

Reported Test Name : ceFAZolin Islt MIC/null	
Numeric Result :	>= 64
Abnormal Flags/Susceptibility Results:	R
Reported Test Name : Cefepime Islt MIC/null	
Numeric Result :	<= 1
Abnormal Flags/Susceptibility Results:	R
Reported Test Name : cefTRIAXone Islt MIC/null	
Numeric Result :	<= 1
Abnormal Flags/Susceptibility Results:	R
Reported Test Name : Ertapenem Islt MIC/null	
Text Result :	2
Numeric Result :	
Abnormal Flags/Susceptibility Results:	R

Lab Order Information

Test Name* : Bacteria Ur Cult

Lab Report Date (mm/dd/yyyy) : 05/23/2021

Ordering Provider

First : [redacted] Last : [redacted]

Affiliation : [redacted] Street : [redacted]

City : [redacted] County : [redacted] State : [redacted] Zip : [redacted]

Phone number : [redacted] Ext :

Laboratory Information

Lab Name* : Oakwood Hospital - Dearborn

Street : 18101 Oakwood Blvd Geocode Source :

City : Dearborn County : Wayne State : Michigan Zip : 48124

Phone number :

Specimen Information

Specimen Collection Date (mm/dd/yyyy) : 05/19/2021

Specimen Source : Urine specimen

Specimen Site :

Specimen Site Text : URINE SPECIMEN OBTAINED BY CLEAN CATCH PROCED

Specimen ID : [redacted]

Results

Reported Test Name : Bacteria Ur Cult/Culture, Urine	
Coded Result :	CARBAPENEM RESISTANT ENTEROBACTER CLOACAE COMPLEX
Numeric Result :	
Abnormal Flags/Susceptibility Results:	A
Comments :	>100,000 CFU/ml Enterobacter cloacae complex, (CRE) MDR - This isolate is resistant to a carbapenem(s)(CRE). Initiate contact precautions. Consider Infectious Diseases consult.

Does this Isolate Meet Reporting Requirements?

- ✓ *Klebsiella pneumoniae*
- ✓ Carbapenemase production
- ✓ KPC carbapenemase gene detected
- ✓ Ertapenem MIC ≥ 4
- ✓ Meropenem MIC ≥ 16

= Confirmed CP-CRE Case

≥100,000 CFU/ml Klebsiella pneumoniae, see comment

Comment: Carbapenem resistant Enterobacteriaceae. Carbapenemase producer. KPC detected.

Antibiotic	MIC	Interpretation
Ampicillin	≥32	Resistant
Ampicillin/sulbactam	≥32	Resistant
Aztreonam	≥64	Resistant
Cefazolin	≥64	Resistant
Cefepime	2	Resistant
Ceftriaxone	8	Resistant
Ertapenem	≥4	Resistant
Gentamicin	≤2	Sensitive
Levofloxacin	≤1	Sensitive
Meropenem	≥16	Resistant
Piperacillin/tazobactam	64	Intermediate
Tobramycin	≤2	Sensitive
Trimethoprim/sulfamethoxazole	≤2	Sensitive

Does this Isolate Meet Reporting Requirements?

✓ *Enterobacter cloacae*

X No phenotypic or molecular carbapenemase testing reported

✓ Ertapenem MIC = 2

X Meropenem MIC = 1

= Suspect CP-CRE Case

≥100,000 CFU/ml Enterobacter cloacae, see comment

Comment: Carbapenem resistant Enterobacteriaceae.

Antibiotic	MIC	Interpretation
Ampicillin	≥32	Resistant
Ampicillin/sulbactam	≥32	Resistant
Aztreonam	≥64	Resistant
Cefazolin	≥64	Resistant
Cefepime	2	Resistant
Ceftriaxone	8	Resistant
Ertapenem	2	Resistant
Gentamicin	≤2	Susceptible
Levofloxacin	≤1	Susceptible
Meropenem	1	Susceptible
Piperacillin/tazobactam	64	Intermediate
Tobramycin	≤2	Susceptible
Trimethoprim/sulfamethoxazole	≤2	Susceptible

Does this Isolate Meet Reporting Requirements?

- ✓ *Escherichia coli*
- X No phenotypic or molecular carbapenemase testing reported
- ? Ertapenem and meropenem reported as 'Resistant' but no MIC value reported

= Can not tell if it meets the case definition or not

≥100,000 CFU/ml Escherichia coli, see comment

Comment: Carbapenem resistant Enterobacteriaceae.

Antibiotic	MIC	Interpretation
Ampicillin	≥32	Resistant
Ampicillin/sulbactam	≥32	Resistant
Aztreonam		Resistant
Cefazolin		Resistant
Cefepime		Resistant
Ceftriaxone		Resistant
Ertapenem		Resistant
Gentamicin	≤2	Sensitive
Levofloxacin	≤1	Sensitive
Meropenem		Resistant
Piperacillin/tazobactam	64	Intermediate
Tobramycin	≤2	Sensitive
Trimethoprim/sulfamethoxazole	≤2	Sensitive

Tips for CP-CRE Reporting

- **Confirm the organism identification**
  - Enterobacterale - Enterobacterales is an order of different types of bacteria which include *Escherichia*, *Klebsiella*, *Enterobacter*, *Salmonella*, *Shigella*, *Citrobacter* and *Yersinia*.
- **Review carbapenem Susceptibility testing MIC values**
  - Doripenem, imipenem, or meropenem ≥ 4 µg/ml; or ertapenem ≥ 2 µg/ml
  - If there are no MIC values reported (e.g., "Resistant") or no carbapenems reported in MDSS, call the laboratory and ask to speak to a bench technologist
- **Check for phenotypic carbapenemase testing**
  - 'Carbapenemase detected' or 'Carbapenemase not detected'
  - Confirm the method used: mCIM, CarbaNP, MBL test
- **Check for molecular carbapenemase testing for resistance mechanisms**
  - KPC, NDM, OXA-48, VIM, IMP

Case Investigation Forms

"Case Report Form (CRF)" or "Case Detail Form", or "Case Investigation Form"

- **Sections**
  - Investigation Information
  - Patient Information
  - Demographics
  - Referral Information
  - Laboratory Testing and Microbiology Information
  - Clinical Information
  - Other Information
  - Case Notes
  - Lab Results

Back Print

CP-CRE Case Report

Carbapenemase-Producing Carbapenem-Resistant Enterobacteriaceae (CP-CRE)

Michigan Department of Health and Human Services

Communicable Disease Division

Collapse all

Back Print

Candida auris Case Report

Michigan Department of Health and Human Services

Communicable Disease Division

Expand all Collapse all

Investigation Information

Investigation ID	Onset Date (mm/dd/yyyy)	Diagnosis Date (mm/dd/yyyy)	Referral Date (mm/dd/yyyy)	Case Entry Date (mm/dd/yyyy)
Investigation Status: Active	Case Status: ○ Confirmed ○ Confirmed - Non Resident ○ Not a Case ○ Probable ○ Suspect ○ Unknown ○ Non-Michigan Case			☐ State Prison Case
Patient Status: Alive	Patient Status Date (mm/dd/yyyy)	Case Disposition	Case Updated Date (mm/dd/yyyy)	Case Completion Date (mm/dd/yyyy)
Date of Death (mm/dd/yyyy)	Investigator First Name: Last Name:		Part of an outbreak?	Outbreak Name

Case Type: ○ Clinical Case ○ Colonization/Screening Case

Clinical Candida auris Case Only:
Was patient previously counted as a colonization/screening case? ○ Yes ○ No ○ Unknown
If patient was previously counted as a colonization/screening case, please provide the related case ID(s)

Patient Information

Patient ID	First	Last	Middle
Street Address			

Candida auris Laboratory Testing

- **Laboratory Testing information is required to determine case classification**
  - Date collected
  - Specimen source
  - Test Type

Back Print

Candida auris Case Report

Michigan Department of Health and Human Services

Communicable Disease Division

+ **Demographics**

+ **Referral Information**

– **Laboratory Testing and Microbiology Information**

Type of facility where specimen was collected:
○ Acute Care Hospital ○ Long-Term Acute Care Hospital ○ Long-Term Care Facility ◉ Outpatient ○ Other
○ Autopsy ○ Unknown

Date Specimen Collected *(mm/dd/yyyy)*: 05/20/2021
County of the facility where specimen collected: Oakland
Facility where specimen collected:

For Clinical Case:
Specimen Source: Other
Other source, specify: Ear Drainage

For Colonization/Screening Case:
Screening swab anatomical site:
Other site:

Clinical Lab Specimen ID (unique isolate No.): [redacted]
Bureau of Labs Specimen ID: [redacted]
WGS Accession ID:

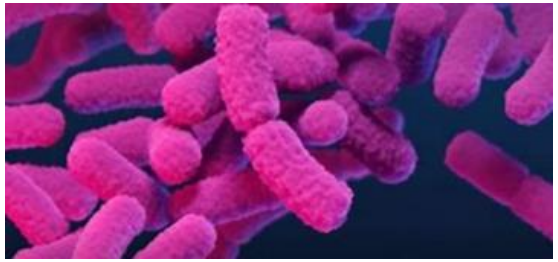
Test Type: MALDI-TOF
Test Method (manufacturer/brand, type of PCR, etc.): Bruker
Result: ◉ Detected ○ Not Detected ○ Indeterminate
Other test, specify:

Test Type:
Test Method (manufacturer/brand, type of PCR, etc.):
Result: ○ Detected ○ Not Detected ○ Indeterminate
Other test, specify:

Test Type:
Test Method (manufacturer/brand, type of PCR, etc.):
Result: ○ Detected ○ Not Detected ○ Indeterminate
Other test, specify:

CP-CRE Laboratory Testing

- **Laboratory Testing information is required to determine case classification**
  - Date collected
  - Specimen source
  - Organism
  - Susceptibility test: MIC
    - need actual numerical value
  - Phenotype test: Carbapenemase testing
    - e.g., mCIM, CarbaNP
  - Molecular test: Resistance mechanism-gene testing
    - e.g. PCR, Carba-R



Organism:
○ *Klebsiella aerogenes* ○ *Klebsiella pneumoniae* ○ *Enterobacter cloacae* ○ *Escherichia coli* ○ *Other, specify:*
○ *Klebsiella oxytoca* ○ *Klebsiella, other* ○ *Enterobacter, other*

Was Antimicrobial Susceptibility Testing performed? ○ Yes ○ No ○ Unknown

Antimicrobial Susceptibility Testing Results:

Antimicrobial	Minimum Inhibitory Concentration (MIC) (ug/ml)	Interpretation (S, susceptible; I, Intermediate; R, resistant)
Doripenem		
Ertapenem		
Imipenem		
Meropenem		

Phenotype Tests: | If Other, specify: | Result: ○ Positive ○ Negative ○ Indeterminate

Molecular Tests: | If Other, specify: | Result: ○ Positive ○ Negative ○ Indeterminate

Resistance Mechanism for Carbapenemase Testing	Response
KPC	○ Detected ○ Not detected ○ Not tested ○ Invalid
NDM	○ Detected ○ Not detected ○ Not tested ○ Invalid
VIM	○ Detected ○ Not detected ○ Not tested ○ Invalid
IMP	○ Detected ○ Not detected ○ Not tested ○ Invalid
OXA-48	○ Detected ○ Not detected ○ Not tested ○ Invalid
OXA-23	○ Detected ○ Not detected ○ Not tested ○ Invalid
Other, specify	○ Detected ○ Not detected ○ Not tested ○ Invalid

Clinical Lab Specimen ID (unique isolate No.): | Bureau of Labs Specimen ID: | WGS Accession ID:

Clinical Info for CP-CRE and *Candida auris*

- Healthcare exposures
  - Acute care, long-term care
- Travel
  - Location
  - Healthcare abroad
  - Very important for confirmed NDM, OXA-48, IMP, or VIM cases

Travel History

Does the patient have a history of Travel outside the USA in the last 12 months? ○ Yes ○ No ○ Unknown

If Yes, please indicate the country and dates of travel

Country: Dates: *(mm/dd/yyyy)* From To

Country: Dates: *(mm/dd/yyyy)* From To

Country: Dates: *(mm/dd/yyyy)* From To

Has the patient received Healthcare outside the USA within the last 12 months? ○ Yes ○ No ○ Unknown

If Yes, what Country:

Has the patient received Healthcare outside the state of Michigan within the last 12 months? ○ Yes ○ No ○ Unknown

If Yes, what State:

Clinical Information

Date of Patient Admission or Presentation *(mm/dd/yyyy)*

Date Patient was placed in Contact Precautions/Isolation (if an inpatient) *(mm/dd/yyyy)*

Patient Admitted/Presented From:
○ Long-Term Care/Skilled Nursing Facility ○ Outside Acute Care Hospital ○ Home
○ Long-Term Acute Care Hospital ○ Unknown ○ Other, specify

Date of Patient Discharge *(mm/dd/yyyy)*

Was information on CRE status shared with transferring agency and admitting facility:
○ Yes ○ No ○ Unknown

Patient Discharged to:
○ Long-Term Care/Skilled Nursing Facility ○ Outside Acute Care Hospital ○ Home
○ Long-Term Acute Care Hospital ○ Unknown ○ Other, specify

Has Patient previously been hospitalized in an Acute Care Hospital in the last 90 days: ○ Yes ○ No ○ Unknown
If Yes, please indicate the facility name and dates of stay (if known)
Facility: Dates: *(mm/dd/yyyy)* From To

Has Patient been admitted to a Long-Term Acute Care Hospital in the last 90 days: ○ Yes ○ No ○ Unknown
If Yes, please indicate the facility name and dates of stay (if known)
Facility: Dates: *(mm/dd/yyyy)* From To

Has Patient been admitted to a Long-Term Care Facility (e.g., nursing home, SNF) in the last 90 days: ○ Yes ○ No ○ Unknown
If Yes, please indicate the facility name and dates of stay (if known)
Facility: Dates: *(mm/dd/yyyy)* From To

Indwelling Devices (in place within 2 calendar days of specimen collection):

Central Venous Line: ○ Yes ○ No ○ Unknown
Mechanical Ventilation: ○ Yes ○ No ○ Unknown
Urinary Catheter: ○ Yes ○ No ○ Unknown
Wound VAC (vacuum-assisted closure): ○ Yes ○ No ○ Unknown

VISA and VRSA

Vancomycin-intermediate *Staphylococcus aureus* (VISA)

Vancomycin-resistant *Staphylococcus aureus* (VRSA)

- Vancomycin is a critical antibiotic for the treatment of MRSA
- Requires a rapid and aggressive containment response
- 16 U.S. cases to date
  - Primarily in MI and DE
  - Last identified in 2021 in MI & NC (first cases since 2015!)

Vancomycin-resistant *Staphylococcus aureus* (VRSA)

- Thought to result from MRSA containing a pSK41-type plasmid and VRE containing *vanA* encoded on an Inc18-like plasmid
  - All 16 cases were vanA +
- Classified based on minimum inhibitory concentration (MIC) on susceptibility test

Vancomycin-susceptible *S. aureus* (VSSA)

- Vancomycin MIC ≤2 µg/ml

Vancomycin-intermediate *S. aureus* (VISA)

- Vancomycin MIC =4-8 µg/ml.

Vancomycin-resistant *S. aureus* (VRSA)

- Vancomycin MIC ≥16 µg/ml.

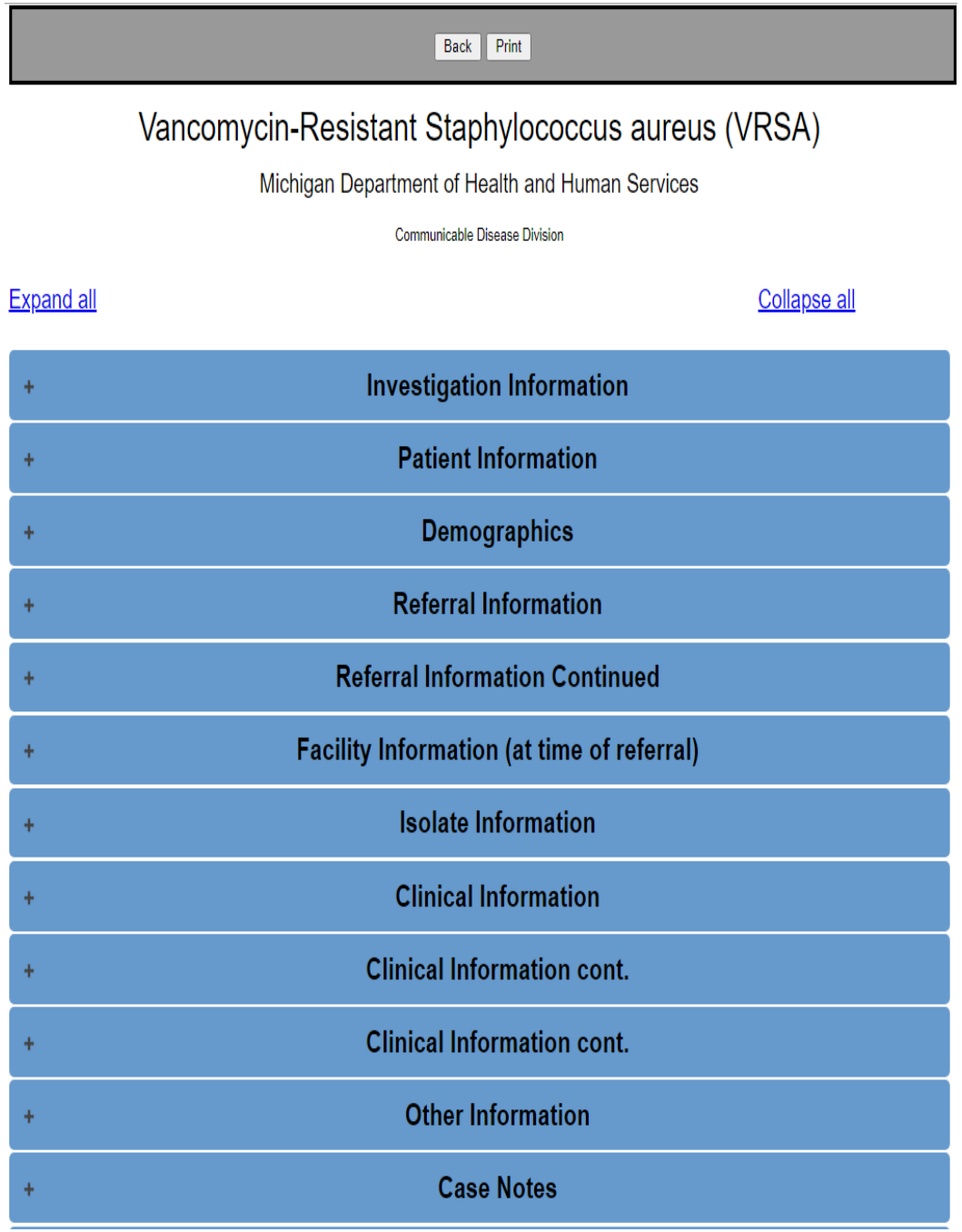
Note: The breakpoints for S. aureus and vancomycin differ from those for other Staphylococcus species. (2015 CLSI M100-S25).

Lab Reports — Help

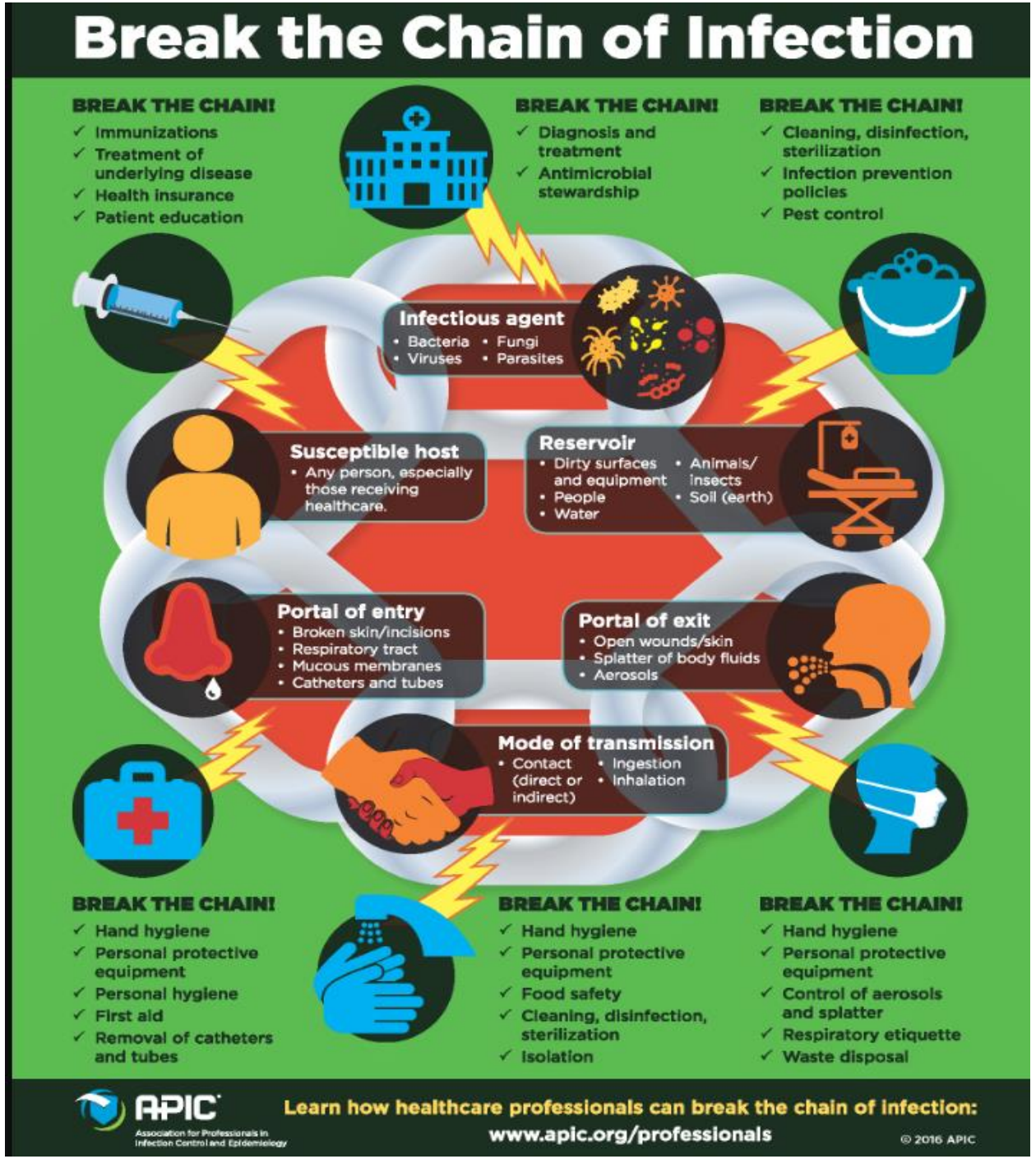
Date Received	Collection Date	Test Name (* Case Associated)	Result	Electronic	
06/21/2021	06/09/2021	Antimicrobial Susceptibility Results *	> 128	Yes	View
06/21/2021	06/09/2021	vanA PCR Result *	vanA gene Detected	Yes	View
06/21/2021	06/09/2021	Bacteria identified *	vanA gene Detected	Yes	View

MDSS VRSA Case Investigation

- Report requires extensive case information
- Reports of suspected VRSA cases
  - Often mixed cultures of VRE and MRSA:
    - Ask laboratories to re-streak for purity and repeat AST
  - *S. aureus* isolates with vancomycin MICs ≥4 µg/ml should be confirmed by a validated method and infection control should be notified
  - *S. aureus* isolates with a vancomycin MICs of ≥ 8 µg/ml should be submitted to health departments and/or CDC for confirmation by a reference method
    - Notify health departments
- Ask facilities to save any MRSA and VRE isolates
- Patients with suspected VRSA should be place in isolation and contact precautions while awaiting results



Containment of Targeted MDROs



2022 Update: Containment of Targeted MDROs

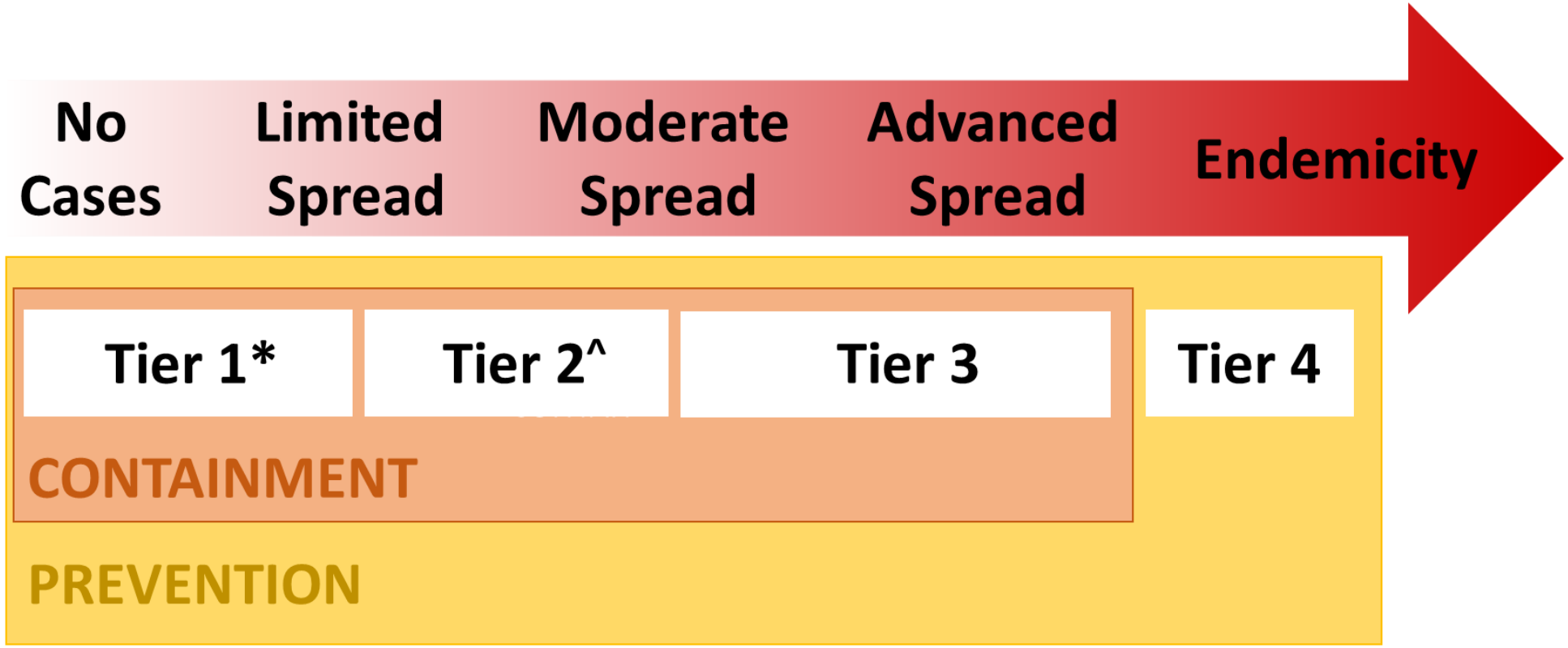
COMING SOON

- Response to a **single case** of targeted resistance
- Goal to slow the spread of resistance
- 4-tiered approach based on organism/mechanism and local epidemiology

Tier	Description	Michigan Examples
1	Novel Resistance and/or resistance mechanisms never or rarely identified in the U.S.	Novel organism VRSA
2	Found in healthcare settings but not found regularly; No current treatment options exist and potential to spread more widely.	Any CPO with NDM, OXA-48, VIM, IMP CRPA or CRAB with KPC *Candida auris* Pan-Nonsusceptible (I or R to all drugs tested) organisms
3	MDROs targeted by region, but not considered endemic.	CP-CRE with KPC or CRAB OXA-23 (Regions 7/8)
4	Endemic in a region	CP-CRE with KPC or CRAB OXA-23 (Other Regions)

CDC Containment Strategy Guidelines for Targeted MDROs

Tier Definitions, Epidemic Stages, Response and Prevention



Organisms or resistance mechanisms that have
*Never (or very rarely) been identified **in the United States** and for which experience is extremely limited are Tier 1
^ Never (or very rarely) been identified **in a public health jurisdiction but are more common in other parts of the U.S.** are Tier 2.

2022 Update: Containment Response Elements

		Tier 1	Tier 2	Tier 3
Healthcare investigation	Review the patient's healthcare exposures prior to and after the positive culture	**30 days**	**30 days**	**Current, sometimes prior admission**
Contact investigation	Screen healthcare roommates			
	Screen additional healthcare contacts			
	Screen household contacts			
	Screen healthcare personnel			
If transmission identified	Repeat PPS at regular intervals if cases identified*			
	Evaluate potential for spread to linked facilities			
Clinical surveillance	Prospective laboratory surveillance			
	Retrospective laboratory surveillance			
Environmental cx	Environmental Sampling			
Ensure adherence to IPC	Infection control assessment w/ observations of practice			

	ALWAYS
	USUALLY
	SOMETIMES
	RARELY

*Periodic (e.g., every two weeks) response-driven PPS should be conducted until transmission is controlled, defined as two consecutive PPS with no new cases identified or, in facilities with high colonization pressure, substantially decreased transmission. If high levels of transmission persist across multiple point prevalence surveys in long term care settings, consider increasing the interval between surveys or temporarily pausing them while reassessing infection control and implementing interventions.

VRSA Investigation Steps

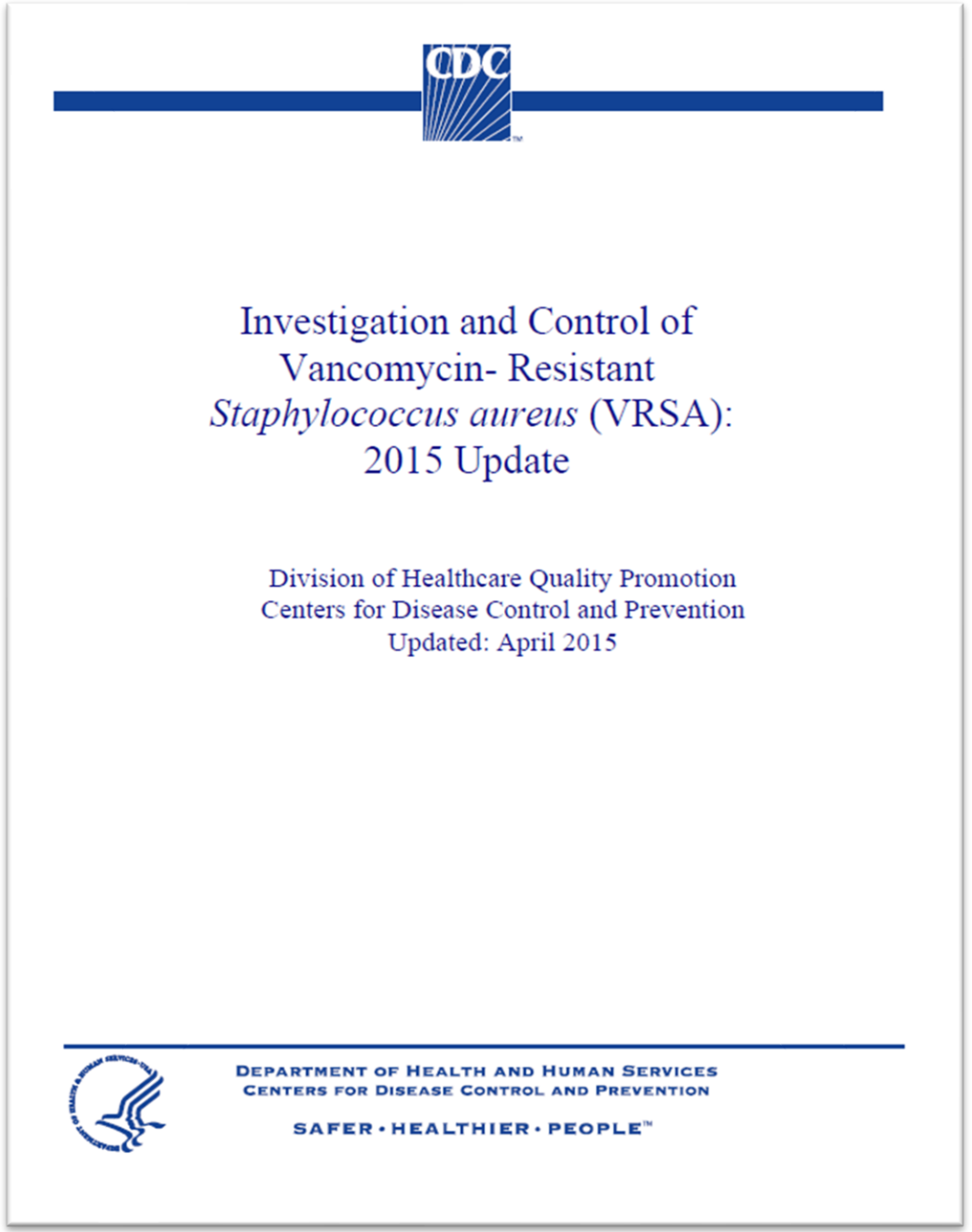
1) Develop a plan for VRSA colonized or infected patients

2) Identify and categorize contacts

3) Specimen collection and screening

4) Evaluate Efficacy of Infection Control Precautions

https://www.cdc.gov/hai/pdfs/VRSA-Investigation-Guide-05_12_2015.pdf



New ICAR Tool

What is an ICAR?

- Infection Control Assessment and Response (ICAR)
- Systematic assessment of a facility's IPC practices
  - Identifies gaps in practices
  - Guides quality improvement
- ICAR tool for general IPC across settings
  - Acute care, long-term care, and outpatient settings
  - Series of 10 modules that can be selected for use by ICAR facilitator
  - Modules are not setting specific

Containment Response

Case Study #1: CP-CRE

Case Study #1

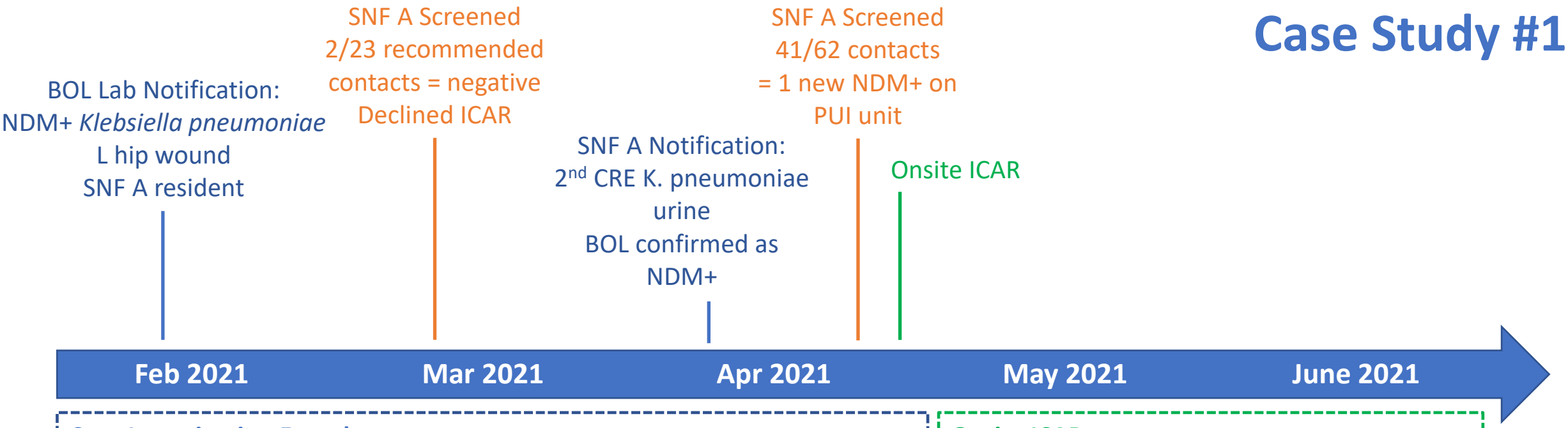
BOL Lab Notification:
NDM+ *Klebsiella pneumoniae*
L hip wound
SNF A resident

SNF A Screened 2 of 23 recommended contacts = negative
Declined ICAR

Case Investigation Found:
- Resided on COVID-19 PUI unit since Oct 2020
- Received in room wound care, PT/OT
- SNF A practicing extended use/reuse of PPE and experiencing staffing shortages

Provided IP Recommendations:
- Enhanced Barrier Precautions
- Transition away from extended use/reuse of PPE
- Ensure high adherence to IPC practices
- Conduct CP-CRE colonization screening for healthcare contacts on PUI unit
- Participate in an ICAR

Case Study #1



Case Investigation Found:

- Resided on LTC unit since Aug 2018, last hospitalization May 2019
- Colostomy that sometimes leaks, dementia
- SNF A still practicing extended use/reuse of PPE and experiencing staffing shortages

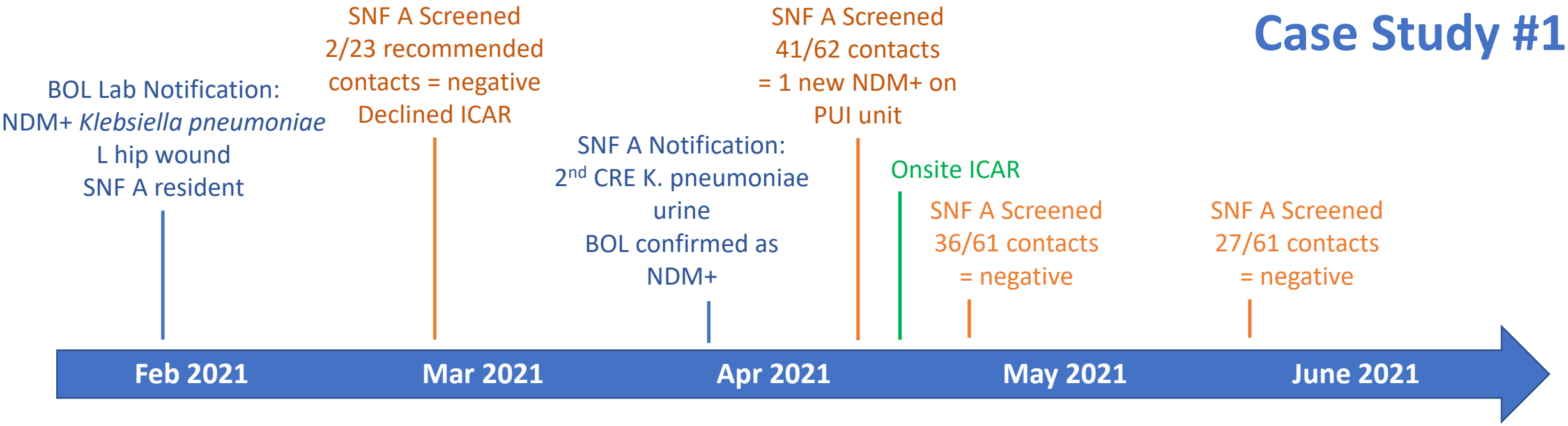
Provided IP Recommendations:

- Enhanced Barrier Precautions
- Transition away from extended use/reuse of PPE
- Ensure high adherence to IPC practices
- Conduct CP-CRE colonization screening for healthcare contacts on all units
- Participate in an ICAR

Onsite ICAR:

- Enhanced Barrier Precautions not fully implemented
- Still practicing extended/reuse PPE
- PPE supplies not stored near point-of-use
- ABHS not available in resident rooms, missed opportunities for hand hygiene observed
- Observed gaps in cleaning & disinfection practices

Case Study #1



Enhanced Surveillance:

- No additional cases detected from clinical cultures at SNF A
- Hospital A (shares patients)
  - Did not detect any additional cases
  - Provided IP recommendations

Case Study #1 Recap
Containment Response Activities

Element	Activity	Tier 2 Recommendation	Case Study #1
Healthcare investigation	Review the patient's healthcare exposures prior to and after the positive culture	**30 days**	**Cases #1, 2, 3**
Contact investigation	Screen healthcare roommates	**√**	**LTC**
	Screen additional healthcare contacts	**√**	**PUI & LTC**
	Screen household contacts	**X**	**X**
	Screen healthcare personnel	**X**	**X**
If transmission identified	Repeat PPS at regular intervals if cases identified*	**√**	**4 PPS**
	Evaluate potential for spread to linked facilities	**√**	**Hospital A**
Clinical surveillance	Prospective laboratory surveillance	**√**	**Monitored**
	Retrospective laboratory	**√**	**Reviewed**
Environmental cx	Environmental Sampling	**X**	**X**
Ensure adherence to IPC	Infection control assessment w/ observations of practice	**√**	**Onsite ICAR**

Containment Response

Case Study #2: C. auris

Case Study #2

Clinical Lab Notification: *Candida auris* urine LTACH A patient

Screened 19 patients = 3 CA+

Case Investigation Found:

- Admitted to LTACH A since Jan 2022; other recent HCF exposures at ACH, LTACH, vSNF since Jul 2021
- Chronic trach/vent, PEG, foley, midline IV, chronic wounds
- On contact precautions since admission

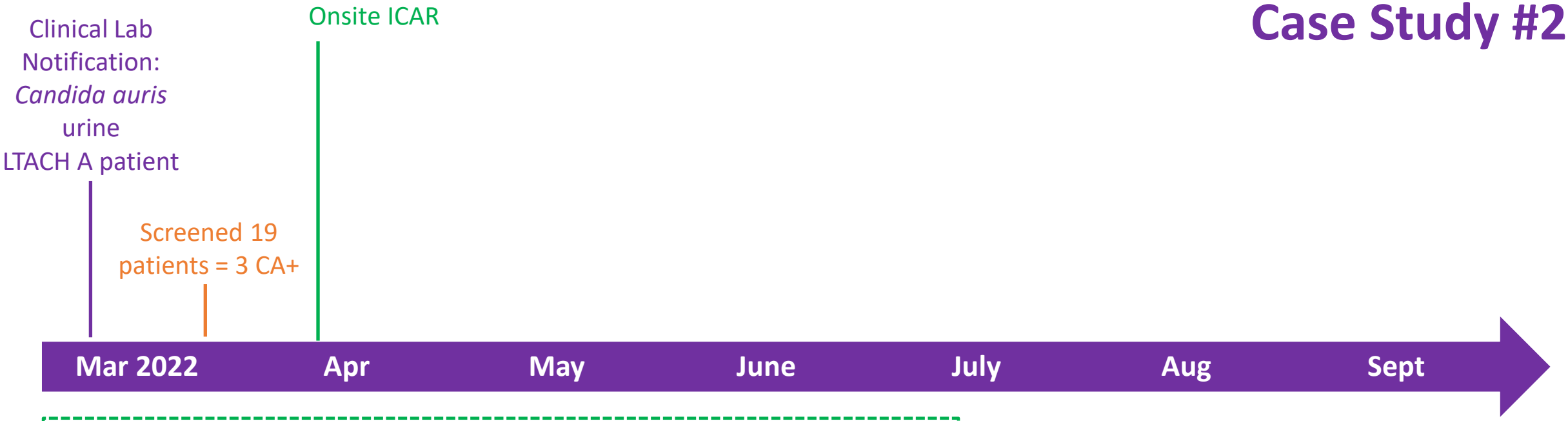
Provided IP Recommendations:

- Contact Precautions
- Ensure high adherence to IPC practices
- Use an EPA List P disinfectant
- Conduct *C. auris* colonization screening for all patients at facility
- Participate in an ICAR

Further IP Recommendations:

- Barrier Precautions for all patients
- Use an EPA List P disinfectant for whole facility
- Conduct *C. auris* & CPO colonization screening for all patients at facility every 2 weeks; admission & discharge screening
- Notify and screen discharges to HCF in past 30 days

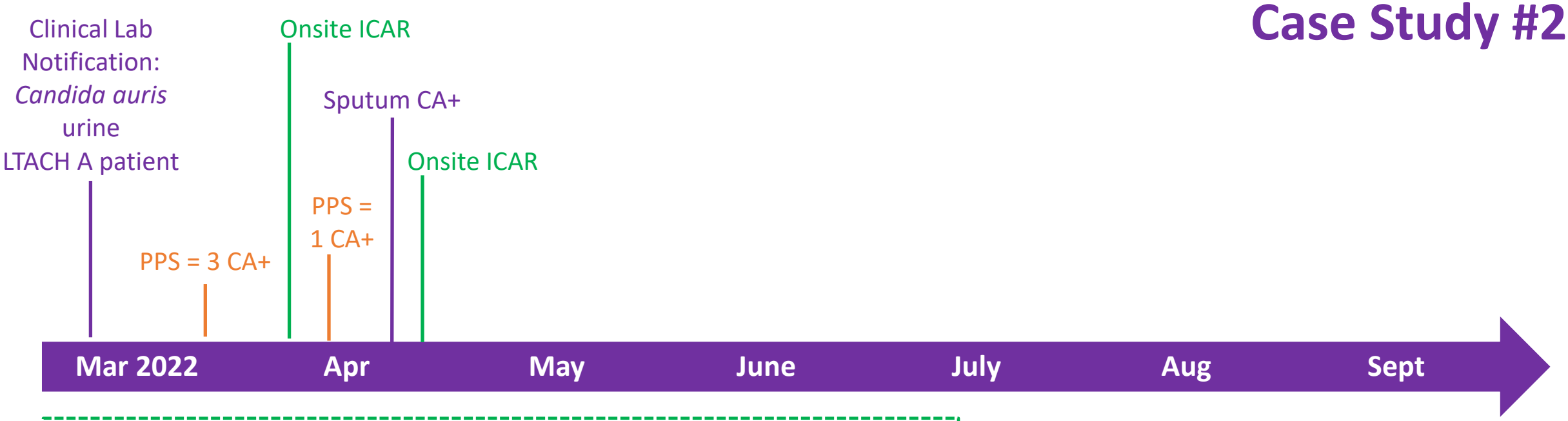
Case Study #2



Onsite ICAR:

- Reviewed outbreak action plan with leadership
- Review case healthcare records, exposure histories, and room/bed movement
- Discussed IPC policies/procedures
- Observations of IPC practices
- Reviewed disinfectant products available – currently only List K disinfectants
- Provided recommendations to strengthen auditing/feedback for hand hygiene, PPE, cleaning & disinfection

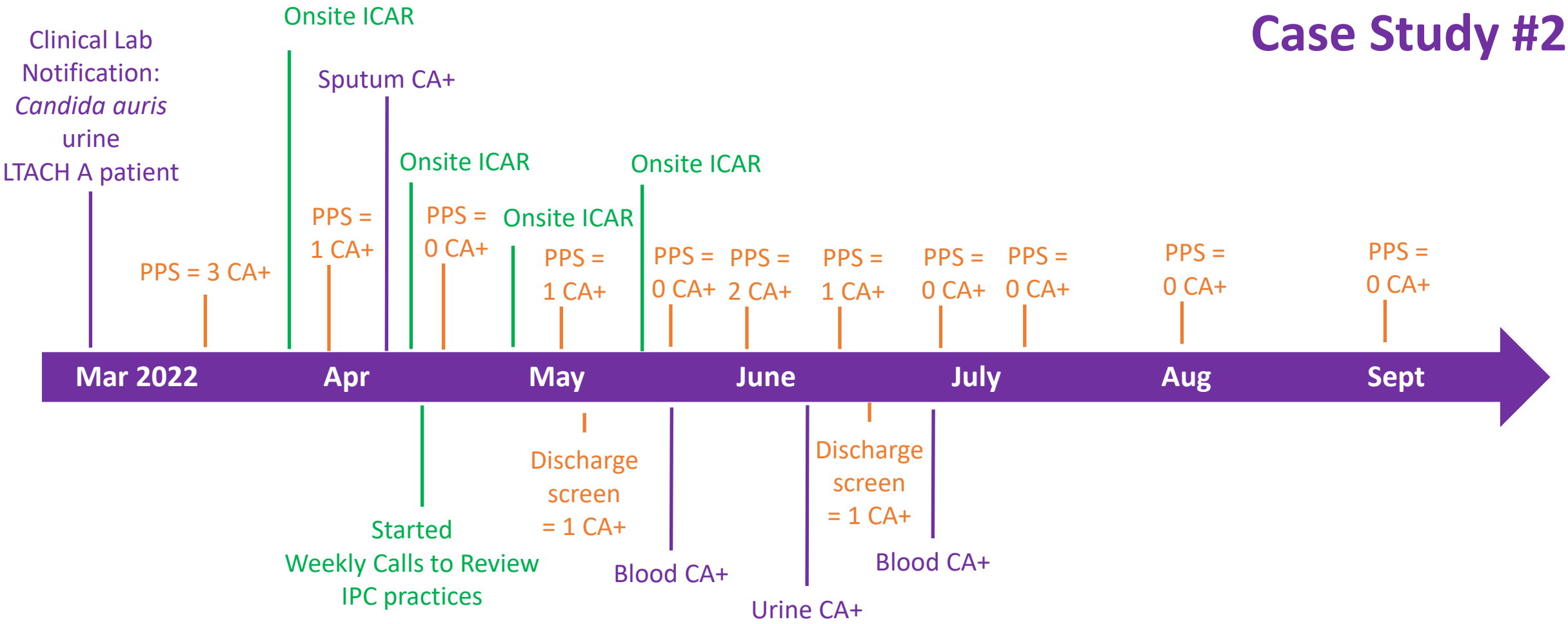
Case Study #2



Onsite ICAR:

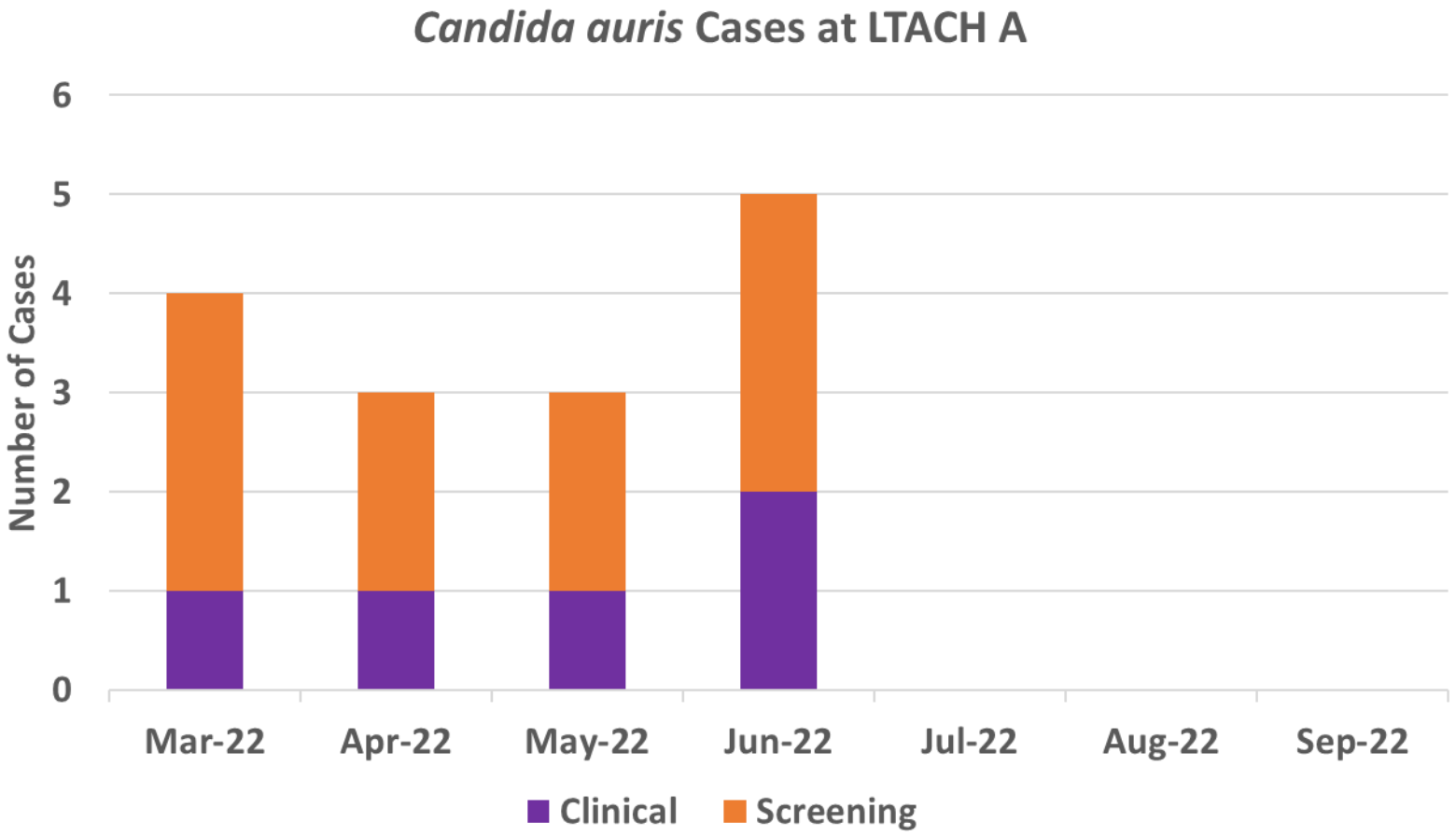
- Reviewed outbreak action plans
- Observations of IPC practices
    - Missed opportunities for hand hygiene, disinfection of mobile workstations for clinical documentation and medication administration
- Reviewed disinfectant products available – mix of List P & List K disinfectants

Case Study #2



Apr 2022 - Colonization screening conducted at epi-linked HCF related to index patient & recent discharges = no additional cases

Case Study #2 Recap – Epi Curve



- 15 *C. auris* cases detected in 12 patients
  - 2 clinical cultures
  - 3 initially detected on colonization screening with subsequent clinical cultures
  - 10 colonization screening

Case Study #2 Recap
Containment Response Activities

Element	Activity	Tier 2 Recommendation	Case Study #2
Healthcare investigation	Review the patient's healthcare exposures prior to and after the positive culture	**30 days**	**15 cases in 12 patients**
Contact investigation	Screen healthcare roommates	**√**	**All roommates**
	Screen additional healthcare contacts	**√**	**All patients**
	Screen household contacts	**X**	**X**
	Screen healthcare personnel	**X**	**X**
If transmission identified	Repeat PPS at regular intervals if cases identified*	**√**	**11 PPS**
	Evaluate potential for spread to linked facilities	**√**	**Epi-linked HCF and Discharges 30 days prior to index**
Clinical surveillance	Prospective laboratory surveillance	**√**	**Monitored – 4 more clinical cases**
	Retrospective laboratory	**√**	**Reviewed**
Environmental cx	Environmental Sampling	**X**	**X**
Ensure adherence to IPC	Infection control assessment w/ observations of practice	**√**	**4 Onsite ICARs plus weekly calls**

Questions?

Contact:
MDHHS SHARP Unit